

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 18

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte CHARLES B. RAU, III

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Appeal No. 1999-0943  
Application 08/906,135<sup>1</sup>

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ON BRIEF

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Before COHEN, FRANKFORT and GONZALES, Administrative Patent Judges.

FRANKFORT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1 through 21, which are all of the claims pending in this application.

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<sup>1</sup> Application for patent filed July 25, 1997. According to Appellant, this application is a continuation of Application 08/607,935, filed February 28, 1996, now abandoned.

Appellant's invention relates to a lightweight brake drum and to a method of manufacturing such a brake drum. Independent claims 1, 12, 17 and 19 are representative of the subject matter on appeal and a copy of those claims, as reproduced from the Appendix to appellant's brief, is attached to this decision.

The sole prior art reference relied upon by the examiner in rejecting the appealed claims is:

Whitfield	2,844,229	July 22, 1958
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Claims 1 through 21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Whitfield.

Rather than attempt to reiterate the examiner's full commentary with regard to the above-noted rejection and the conflicting viewpoints advanced by the examiner and appellant regarding the rejection, we make reference to the final rejection (Paper No. 10, mailed October 28, 1997) and examiner's answer (Paper No. 13, mailed May 29, 1998) for the reasoning in support of the rejection, and to appellant's brief (Paper No. 12, filed March 30, 1998) and reply brief (Paper No. 14, filed July 27, 1998) for the arguments thereagainst.

OPINION

As a preliminary matter, we note that on pages 11 and 12 of the brief appellant has set out seven groupings of his claims. In accordance with those groupings, in the following portions of our decision we will specifically discuss independent claims 1, 12, 17 and 19, and dependent claims 2, 6 and 10 which have each been separately argued by appellant. Claims 4, 5, 7, 8, 9 and 11 will stand or fall on the basis of our determination regarding independent claim 1, claim 3 will stand or fall with claim 2, claims 13 through 16 will stand or fall with claim 12, claim 18 will stand or fall with claim 17, and claims 20 and 21 will stand or fall with claim 19.

In reaching our decision in this appeal, we have given careful consideration to appellant's specification and claims, to the applied prior art Whitfield reference, and to the respective positions articulated by appellant and the examiner. As a consequence of our review, we have made the determinations which follow.

In rejecting independent claims 1, 12, 17 and 19 under 35 U.S.C. § 102(b) based on Whitfield, the examiner has indicated that this patent discloses a brake drum comprising a tubular inner member formed of the elements (11) and (16) seen in Figure 2 of the patent, wherein said composite inner member (11, 16) has an outer surface and an inner surface, and the inner surface is capable of, or "suitable for," directly slidably contacting a brake pad. Note

particularly, page 4, lines 5-6, of the final rejection and page 3, lines 17-18, of the examiner's answer, wherein the examiner urges that the inner member of Whitfield is capable of contacting a brake pad "via member or drum 11." The examiner has also determined that the inner member of Whitfield is "formed of" a first material, since the inner member (11, 16) is at least in-part (i.e., at layer 16) formed of a low fusing temperature metal, such as aluminum, copper or magnesium. In addition, the examiner notes that Whitfield discloses a length of wire (20) snugly wrapped in multiple turns around a portion of the exterior surface of the inner member (11, 16), with said wire being, at least in-part, "formed of" a second material, i.e., such as high-tensile strength steel or alloy steel at core (22). The examiner points to the backing plate (12) of Whitfield as providing a fastener for securing at least a portion of a wheel assembly to the brake drum, and further points out that the first material (at layer 16) has a density less than that of the second material (at wire core 22) and that the second material has a strength greater than the first material. With regard to appellant's method claim 17 on appeal, the examiner urges that the method steps claimed by appellant are inherently performed in the construction of the brake drum in Whitfield.

Appellant's arguments in the brief and reply brief that the "formed of" language in the claims on appeal is exclusive and therefore precludes a reading of the claimed inner member and claimed wire respectively on the inner member (11, 16) and wire (20) in Whitfield, are unpersuasive. In our opinion, the "formed of" language in the claims on appeal does not require that the inner member be exclusively or entirely formed of a first material (e.g., aluminum), or that the wire of the claims on appeal be exclusively or entirely formed of a second material (e.g., alloy steel). Just as a window, for example, is "formed of" wooden frame members and glass panes, the inner member of Whitfield is "formed of" the cast iron or steel drum (11) and the layer (16) of low fusing temperature metal, while the wire (20) in Whitfield is "formed of" a high-tensile strength steel or alloy steel core (22) and a coating layer of low fusing temperature metal (24). Thus, when the language of the claims on appeal is given its broadest reasonable interpretation, we agree with the examiner that the inner member (11, 16) of Whitfield is, at least in-part, "formed of" a first material at layer (16) and that the wire (20) of Whitfield is, at least in-part, "formed of" a second material at core (22), and that these first and second materials have the density and strength relationships set forth in appellant's claims on appeal.

We likewise agree with the examiner that the wire (20) in Whitfield is "snugly wrapped" in multiple turns around the exterior surface of the inner member therein as required in claim 1 on appeal and, more particularly, with a tension of at least about twenty-five foot pounds as set forth in dependent claim 6 on appeal. Note column 4, lines 8-16, of Whitfield, wherein it is

indicated that the wire is tension wound about the inner member (11, 16) “with a drag of between 5 and 100 pounds” so as to generate considerable compressive force in the flange of the drum which counteracts the expansive force developed in the drum during normal or heavy-duty braking. Appellant’s position (reply brief, page 6) that the wire in Whitfield, and particularly the core (22), is “completely relaxed” by the fusion of the low fusing temperature metals (16, 24) during formation of the brake drum, is belied by the express disclosure in Whitfield (e.g., col. 4, lines 11-13, and col. 4, lines 44-48, that the compressive force of the wire therein is amply sufficient to reinforce and prevent distortion of the drum flange during use and to counteract the expansive force developed in the drum during normal or heavy-duty braking.

Based on the foregoing, we will sustain the examiner’s rejection of claims 1 and 6 on appeal under 35 U.S.C. § 102(b) as being anticipated by Whitfield. In accordance with appellant’s grouping of the claims, it follows that dependent claims 4, 5, 7, 8 and 9, and claim 11, will fall with claim 1.

Dependent claim 2 on appeal adds the limitation to claim 1 that the brake drum includes “an outer shell molded over and completely covering the length of the wire” and that the outer shell is formed of a third material having a coefficient of expansion approximately equal to that of the first material. In treating this claim, the examiner has taken the position that the fused material seen in Figures 1 and 2 of Whitfield constitutes an “outer shell” molded over and

completely covering the length of the wire, and that since Whitfield indicates that the layer (16) and the coating material (24) of the wire therein are made of the same or similar materials, that the outer shell material will have a coefficient of expansion “approximately equal” to that of the first material (at layer 16). We agree with the examiner, and will accordingly sustain the rejection of claim 2 on appeal under 35 U.S.C. § 102(b). Per appellant’s grouping of the claims, dependent claim 3 will fall with claim 2.

Appellant’s claim 10 on appeal adds the further limitation that the inner member of claim 1 is “made of an alloy which includes at least about seventy-five volume percent of aluminum and between about ten volume percent and about twenty-five volume percent abrasive material.” Since we agree with appellant that Whitfield fails to disclose or teach any such alloy with abrasive material therein, we will not sustain the examiner’s rejection of claim 10 on appeal under 35 U.S.C. § 102(b). Similarly, since independent claim 19 likewise includes the same recitation concerning the particular material from which the tubular inner member is formed, and such has been separately argued by appellant, we will also not sustain the examiner’s rejection of claim 19 on appeal under 35 U.S.C. § 102(b). It follows that the examiner’s rejection of claim 20, which depends from claim 19, and claim 21 will also not be sustained.

Independent claim 12 on appeal is similar to claim 1, but includes a recitation regarding an outer shell like that previously set forth in dependent claim 2. Again, we are in agreement

with the examiner's position that the fused material seen in Figures 1 and 2 of Whitfield constitutes an "outer shell" molded over and completely covering the length of the wire, and that since Whitfield indicates that the layer (16) and the coating material (24) of the wire therein are made of the same or similar materials, that the first material (16) and the third material of Whitfield's brake drum outer shell have respective densities less than that of the second material from which the core (22) of the wire is formed and that the second material has a strength greater than the first material. Accordingly, we will sustain the examiner's rejection of claim 12 on appeal under 35 U.S.C. § 102(b). In light of appellant's grouping of the claims, it follows that dependent claims 13 through 15 and claim 16 will fall with claim 12.

The last claim for consideration on appeal is method claim 17. Since we agree with the examiner that in manufacturing the brake drum of Whitfield, the method steps as set forth in claim 17 on appeal will inherently be carried out, we will sustain the examiner's rejection of claim 17 on appeal under 35 U.S.C. § 102(b). Again, given appellant's grouping of the claims, it is clear that dependent claim 18 will fall with claim 17.



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In light of the foregoing, the examiner's decision rejecting claims 1 through 21 under 35 U.S.C. § 102(b) as anticipated by Whitfield is affirmed as to claims 1 through 9 and 11 through 18, but not as to claims 10 and 19 through 21.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

AFFIRMED-IN-PART

IRWIN CHARLES COHEN  
Administrative Patent Judge

CHARLES E. FRANKFORT  
Administrative Patent Judge

JOHN F. GONZALES  
Administrative Patent Judge

# BOARD OF PATENT APPEALS AND INTERFERENCES

CEF/dal

Appeal No. 1999-0943  
Application 08/906,135

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## APPENDIX

1. A brake drum comprising:

(a) a tubular inner member having an exterior surface and an interior surface suitable for directly slidingly contacting a brake pad, the inner member being formed of a first material;

(b) a length of wire snugly wrapped in multiple turns around a portion of the exterior surface, the wire being formed of a second material;

(c) at least one fastener for securing at least a portion of a wheel assembly to the brake drum,

wherein the first material has a density less than that of the second material, and the second material has a strength greater than the first material.

12. A brake drum comprising:

(a) a tubular inner member having an exterior surface and an interior surface suitable for directly slidingly contacting a brake pad, the inner member being formed of a first material;

(b) a length of wire tightly wrapped in multiple turns around substantially the entire exterior surface of the inner member, the wire being formed of a second material; and

(c) a tubular outer shell molded over and substantially covering the length of wire, the outer shell being formed of a third material,

wherein the first material and the third material have respective densities less than that of the second material and the second material has a strength greater than the first material.

17. A method for manufacturing a brake drum comprising the steps of:

(a) manufacturing a tubular inner member having an exterior surface and an interior surface suitable for directly slidingly contacting a brake pad, the inner member being formed of a first material having a density of not more than 0.15 pounds per cubic inch;

(b) wrapping a length of wire in multiple turns tightly around a portion of the exterior surface, the wire being formed of a material having a tensile strength of at least about 180,000 psi; and

(c) molding an outer shell over and substantially covering the length of wire,

wherein the wire is maintained at a tension of at least about twenty-five foot-pounds subsequent to the step of molding.

19. A brake drum comprising:

(a) a tubular inner member having an interior surface suitable for directly slidingly contacting a brake pad and an exterior surface, the inner member being made from an alloy which includes at least about seventy-five volume percentage of aluminum and between about ten volume percent and about twenty-five volume percent abrasive material;

(b) a length of wire tightly wrapped in multiple turns around substantially the entire exterior surface, the length of wire having a diameter of between about 0.05 inches to about 0.25 inches, the wire being formed of a high-strength steel alloy; and

(c) a tubular outer shell molded over and substantially covering the length of the wire, the tubular outer shell including at least one fastener for securing at least a portion of a wheel assembly to the brake drum, the outer shell being made from material which includes at least about seventy-five volume percent of aluminum,

wherein the wire has a tension of at least about twenty-five foot-pounds following molding of the outer shell.